REMARKS

In the Office Action the Examiner noted that claims 1-16 are pending in the application, and the Examiner rejected all claims. By this Amendment, claims 1-2, 5-6, and 9-10 have been amended, and new claim 17 has been added. No new matter has been presented. Thus, claims 1-17 are pending in the application. The Examiner's rejections are traversed below, and reconsideration of all rejected claims is respectfully requested.

Information Disclosure Statement

In item 1 on page 2 of the Office Action the Examiner alleged that the IDS filed on January 26, 2004 fails to comply with 37 C.F.R. §1.98(a) because it does not include a full translation of relevant material, as it is presently understood by the individual designated in 37 C.F.R. §1.56(c) most knowledgeable about the content of the information, of each patent listed that is not in the English language.

The Applicants respectfully submit that, as shown on Form PTO-1449 of the IDS filed on January 26, 2004, English translations of the Abstracts were submitted along with each of the cited references of the IDS. Further, MPEP §609.04(a)(III) states, "Submission of an English language abstract of a reference may fulfill the requirement for a concise explanation." Also, §1.98(a) does not require "a full translation of relevant material," as stated by the Examiner, but rather a "concise explanation of the relevance." As such, the Applicants respectfully request that the Examiner at least consider the submitted translated Abstracts, and return the Form PTO-1449 to indicate that at least the Abstracts were considered.

Claim Objections

In items 2-3 on page 2 of the Office Action the Examiner objected to claims 1 and 5 because of various grammatical informalities identified by the Examiner. For example, the Examiner stated that the word "first" was misspelled as "fist" in the claims.

By this Amendment, claims 1 and 5 have been amended, and are no longer in the form objected to by the Examiner. Therefore, the Applicants respectfully request the withdrawal of the Examiner's objections to claims 1 and 5.

Claim Rejections Under 35 USC §112

In item 5 on pages 2-3 of the Office Action the Examiner rejected claims 1-2, 5-6, and 9-10 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicants regard as the invention. For example, the Examiner stated that it is unclear how the "image data subsequent" is differentiated from "the image data" as the claim language refers to the same "image data."

By this Amendment, claims 1-2, 5-6, and 9-10 have been amended, and are no longer in the form rejected by the Examiner. The Applicants respectfully submit that the claims satisfy the requirements of §112, second paragraph, and further respectfully request the withdrawal of the Examiner's rejections of these claims.

Claim Rejections Under 35 USC §102

In item 7 on pages 3-4 of the Office Action the Examiner rejected claims 1-10, 12, and 14 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,410,376, issued to Cornsweet et al. (hereinafter referred to as "Cornsweet"). The Applicants respectfully traverse the Examiner's rejections of these claims.

Claim 1 of the present application, as amended, recites "identifying a first area of an eye in a piece of image data", and storing "the identified first area as the tracking area." The Applicants respectfully submit that Cornsweet neither discloses nor suggests at least these features of claim 1.

Cornsweet discloses a method of measuring fast eye movements using a quadrant detector which detects the relative direction of movement in a subject's eye. However, in Cornsweet the movements are measured by comparing single signals, such as the error signal output by the quadrant detector, to determine how and when to move motors which drive a mirror mechanism to reflect light on the subject's eye (Column 5, Lines 51-66). The single signals are single values which are compared to one another. This is in direct contrast to the area of the eye that is identified and stored for comparison purposes in claim 1 of the present application. While the Examiner stated that Cornsweet, by storing and comparing a new value with an old value, discloses a tracking area by storing and comparing these single values. However, it would be apparent to one skilled in the art that storing and comparing single signal values is vastly different from storing and comparing areas identified in a piece of image data. The Applicants respectfully submit that the Examiner's characterization of a single value in

Cornsweet as the tracking area of claim 1 is not reasonable. Each area identified and/or stored in the apparatus recited in claim 1 is taken from image data, and therefore includes a plurality of values of pixels, while the values compared in Cornsweet are simply single signals. Therefore, Cornsweet does not disclose or suggest at least identifying a first area of an eye in a piece of image data, and storing the identified first area as the tracking area.

Claim 1 of the present application also recites "calculating a correlation value between the tracking area and the second area." The Applicants respectfully submit that Cornsweet also does not disclose or suggest at least this feature of claim 1.

The Examiner characterized the calculation of the difference between the two single values in the FIFO system of Cornsweet, which is done to calculate whether the difference is greater than 20% of the active signal to detect whether blinking has occurred, as calculating a correlation value. However, the correlation value is a statistical value which shows the similarity of the tracking area and the second area, which is demonstrably different from calculating a difference between two single values. Therefore, not only are there no areas to compare in Cornsweet, but there is also no calculation of a correlation value.

Further, regarding the Examiner's characterization of the active signal of Cornweet as the recited "threshold" stored in claim 1 of the present application, the recited threshold is a predetermined value, i.e. a static value, while the active signal is a dynamically varying value. Therefore, it is apparent that the active signal is not a stored threshold. Further, while the Examiner stated that the "threshold" of Cornsweet is used to determine whether blinking has occurred, Cornsweet states, in Lines 57-61 of Column 12, that "Since the plateau level of the sum signal (defined as the signal level when the eye is open) will vary with gaze angle and pupil diameter, setting up a fixed threshold value, above which the eye is open and below which the eye is closed, to detect blinks cannot work." Even further, there is an obvious functional difference between the recited threshold of claim 1 and the active signal of Cornsweet, in that the threshold is a standard value used to determine whether the correlation value between the tracking area and the second area is within an acceptable range, whereas the active signal of Cornsweet is used for deciding each operation of servomotors in steps. Thus, Cornsweet does not disclose or suggest "calculating a correlation value between the tracking area and the second area; and comparing the calculated correlation value with the threshold stored in the threshold storing unit."

Therefore, Cornsweet does not disclose or suggest at least the features of claim 1 discussed above. Accordingly, Cornsweet does not disclose every element of the Applicants'

claim 1. In order for a reference to anticipate a claim, the reference must teach each and every element of the claim (MPEP §2131). Therefore, since Cornsweet does not disclose the features recited in independent claim 1, as stated above, it is respectfully submitted that claim 1 patentably distinguishes over Cornsweet, and withdrawal of the §102(b) rejection is earnestly and respectfully solicited.

Independent claims 5 and 9-10 recite similar features to those discussed above in regard to claim 1. Therefore, it is respectfully submitted that claims 5 and 9-10 also patentably distinguish over Cornsweet.

Claims 2-4 depend from claim 1, and claims 6-8 depend from claim 5, and these dependent claims include all of the features of their respective independent claims as well as additional features which are not disclosed or suggested in Cornsweet. Therefore, it is respectfully submitted that claims 2-4 and 6-8 also patentably distinguish over Cornsweet.

Regarding claims 12 and 14, the Examiner has rejected these claims under §102, but rejected the independent claims 11 and 13, upon which claims 12 and 14 respectively depend, under §103. Thus, as independent claims 11 and 13 are not able to be rejected under §102, the Applicants respectfully submit that it is improper to reject dependent claims 12 and 14 under §102, and further respectfully request the withdrawal of the Examiner's §102 rejections of claims 12 and 14. Also, as shown in the next section of this Amendment, claims 11 and 13 also patentably distinguish over Cornsweet, and therefore claims 12 and 14 patentably distinguish over Cornsweet on those grounds as well.

Claim Rejections Under 35 USC §103

In items 9-10 on page 5 of the Office Action the Examiner rejected claims 11, 13, and 15-16 under 35 U.S.C. §103(a) as being unpatentable over Cornsweet. The Applicants respectfully traverse the Examiner's rejections of these claims.

Claim 11 of the present application recites "judging an open/close state of the eye on the basis of the detected shape of the lid." The Examiner acknowledged that Cornsweet does not disclose this feature of claim 11, but went on to state that it "would have been obvious to one of ordinary skill in the art that calculating a rapid change can be detected over the quadrant detectors then the lid shape can also be determined as the lid closing equates to both the rapid quadrant detector sum change and the open close/state of the eye." The Applicants respectfully disagree with the Examiner's assertion on this point.

The quadrant detector of Cornsweet comprises four IR detectors, one for each of first, second, third, and fourth quadrants of an image plane onto which an image of the subject's pupil is projected by a beam splitter (Column 3, Lines 62-68). Therefore, as all of the IR detectors of the quadrant detector are fixed on the pupil of the eye, the Applicants respectfully submit that not only is it not obvious to determine a lid shape through this quadrant detector, but it would not even be possible to do so. If the IR detectors are each detecting areas of the subject's pupil, there would be no possible way to detect the shape of the lid simply by detecting that the subject has blinked his eye, as even with a blinked lid the quadrant detector is still fixed on the relatively small area of the pupil, and does not encompass enough of the lid to even reasonable predict a shape. In other words, to determine eye opening/closing status, Cornsweet uses a change of pupil exposure within the bounds of the pupil. This is direct contrast to at least one embodiment enabled by claim of the present application, in which a change of a curvature of an upper eyelid is used to judge an open/close state of the eye. This allows the apparatus of claim 11 to be used with a person whose eyes are very thin and eyelashes are very long, and whose pupils are difficult to be seen, because a target for the eye tracking and opening/closing detection can be found with relative ease, which would not be possible with the pupil detection of Cornsweet.

Therefore, the Applicants respectfully submit that the features recited in claim 11 of the present application are not suggested by the disclosure of Cornsweet, and further that the modification suggested by the Examiner is not only taught away from, but also not possible. Thus, the Applicants respectfully request the withdrawal of the Examiner's §103 rejections.

Claims 13 and 15-16 recite similar features to those discussed above in regard to claim 11. Therefore, it is respectfully submitted that claims 13 and 15-16 also patentably distinguish over Cornsweet.

New Claim 17

New claim 17 is directed to a method of detecting and tracking an eye, the method comprising storing a first area as a tracking area and identifying a second area of an eye in image data obtained subsequently to the stored tracking area according to the stored tracking area. As discussed above in regard to similar features of claim 1, Cornsweet does not disclose or suggest at least these features of claim 17. Therefore, the Applicants respectfully submit that claim 17 also patentably distinguishes over Cornsweet.

Summary

In accordance with the foregoing, claims 1-2, 5-6, and 9-10 have been amended, and new claim 17 has been added. No new matter has been presented. Thus, claims 1-17 are pending in the application.

There being no further outstanding objections or rejections, it is respectfully submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

STAAS & HALSEY LLP

Date: _08/31/06_   By: _Thomas T. Jones_
                              Thomas L. Jones
                              Registration No. 53,908

1201 New York Avenue, NW, 7th Floor
Washington, D.C. 20005
Telephone: (202) 434-1500
Facsimile: (202) 434-1501